

Claims

1. Electrical power transmission line (1) comprising:
 - at least one electrical cable (2);
 - at least one shielding element (6) made of at least one ferromagnetic material arranged in a radially outer position with respect to said at least one cable (2) for shielding the magnetic field generated by said cable (2), said at least one shielding element (6) comprising a base (10) and a cover (11); and
 - at least one supporting element (7) coupled to at least said base (10) of the shielding element (6).
- 10 2. Electrical power transmission line (1) according to claim 1, wherein said at least one cable (2) comprises three cables arranged according to a trefoil arrangement.
3. Electrical power transmission line (1) according to claim 1, wherein said line (1) is placed underground.
- 15 4. Electrical power transmission line (1) according to claim 1, wherein said base (10) and said cover (11) are substantially continuous.
5. Electrical power transmission line (1) according to claim 1, wherein said base (10) comprises a bottom wall (10a) and a pair of side walls (10b, 10c).
6. Electrical power transmission line (1) according to claim 5, wherein said bottom wall (10a) and said pair of side walls (10b, 10c) are substantially flat.
- 20 7. Electrical power transmission line (1) according to claim 5, wherein said side walls (10b, 10c) extend in a direction substantially perpendicular to said bottom wall (10a).
8. Electrical power transmission line (1) according to claim 5, wherein said base (10) further comprises a pair of flanges (10d, 10e) extending in a predetermined direction from the end portions of the side walls (10b, 10c) of the base (10).
- 25 9. Electrical power transmission line (1) according to claim 8, wherein said flanges (10d, 10e) extend outwardly from the end portions of the side walls (10b, 10c) of the base (10).

10. Electrical power transmission line (1) according to claim 8, wherein said flanges (10d, 10e) extend inwardly from the end portions of the side walls (10b, 10c) of the base (10).
- 5 11. Electrical power transmission line (1) according to claim 5, wherein said flanges (10d, 10e) extend in a direction substantially perpendicular to the end portions of the side walls (10b, 10c) of the base (10).
12. Electrical power transmission line (1) according to any one of the previous claims, wherein said cover (11) is substantially continuous.
- 10 13. Electrical power transmission line (1) according to claim 12, wherein said cover (11) comprises a main wall (11a) and a pair of flanges (11b, 11c) extending from the main wall (11a) in a predetermined direction.
14. Electrical power transmission line (1) according to claim 13, wherein said flanges (11b, 11c) extend in a direction substantially perpendicular to said main wall (11a).
- 15 15. Electrical power transmission line (1) according to claim 1, wherein said base (10) and said cover (11) comprise walls (10a, 10b, 10c; 11a) having a thickness comprised between about 0.20 mm and about 0.35 mm.
16. Electrical power transmission line (1) according to claim 1, wherein said base (10) and said cover (11) comprise respective sides superimposed for a portion of predetermined length in lateral direction.
- 20 17. Electrical power transmission line (1) according to claim 16, wherein a material having a permeability greater than air is interposed at the superimposed sides of the base (10) and of the cover (11).
18. Electrical power transmission line (1) according to claim 1, wherein said base (10) and said cover (11) comprise walls (10a, 10b, 10c; 11a) having a rolling direction substantially perpendicular to the axis of said at least one cable (2).
- 25 19. Electrical power transmission line (1) according to claim 1, wherein said shielding element (6) comprises a plurality of shielding modules (12) arranged side by side, each of said shielding modules (12) comprising a modular base (10) and a modular cover (11).

20. Electrical power transmission line (1) according to claim 19, wherein said shielding modules (12) are longitudinally superimposed for a portion of predetermined length.
21. Electrical power transmission line (1) according to claim 20, wherein said predetermined length is comprised between 25% and 100% of the width of said shielding element (6).
22. Electrical power transmission line (1) according to claim 19, further comprising a respective connecting element made of ferromagnetic material for connecting said shielding modules (12) arranged side by side.
23. Electrical power transmission line (1) according to claim 19, wherein, in each of said shielding modules (12), said modular base (10) and said modular cover (11) are reciprocally staggered in longitudinal direction by a predetermined distance.
24. Electrical power transmission line (1) according to claim 19, wherein, in each of said shielding modules (12), said modular base (10) is coupled to a respective supporting element (7).
25. Electrical power transmission line (1) according to claim 19, wherein at least two adjacent shielding modules (12) extend along different directions, said shielding element (6) further comprising a respective connecting element (13) made of ferromagnetic material for connecting said at least two adjacent shielding modules (12).
26. Electrical power transmission line (1) according to claim 1 or 25, wherein said ferromagnetic material has a maximum value of relative magnetic permeability μ_{\max} greater than about 20000.
27. Electrical power transmission line (1) according to claim 1 or 25, wherein said ferromagnetic material has a maximum value of relative magnetic permeability μ_{\max} comprised between about 20000 and about 60000.
28. Electrical power transmission line (1) according to claim 26 or 27, wherein said ferromagnetic material is selected from the group comprising: grain oriented silicon steel, non-grain oriented silicon steel, Permalloy®, Superalloy®.
29. Electrical power transmission line (1) according to claim 28, wherein the silicon content is comprised between about 1% and about 5%.

30. Electrical power transmission line (1) according to claim 1, wherein said base (10) is made of a first ferromagnetic material having a maximum value of relative magnetic permeability μ_{\max} greater than about 40, and wherein said cover (11) is made of a second ferromagnetic material having a maximum value of relative magnetic permeability μ_{\max} greater than about 20.

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31. Electrical power transmission line (1) according to claim 1, further comprising a supporting element (7) coupled to said cover (11) of the shielding element (6).

32. Electrical power transmission line (1) according to claim 1 or 31, wherein said at least one supporting element (7) is arranged in a radially outer position with respect to 10 said at least one shielding element (6).

33. Electrical power transmission line (1) according to claim 1 or 31, wherein said at least one supporting element (7) is arranged in a radially inner position with respect to said at least one shielding element (6).

34. Electrical power transmission line (1) according to claim 1 or 31, wherein said at 15 least one shielding element (6) is interposed between a pair of supporting elements (7).

35. Electrical power transmission line (1) according to claim 1 or 31, wherein said at least one supporting element (7) is substantially flat.

36. Electrical power transmission line (1) according to claim 1 or 31, wherein said at least one supporting element (7) comprises a respective wall having a thickness 20 comprised in the range from about 1 to about 20 mm.

37. Electrical power transmission line (1) according to claim 1 or 31, wherein said at least one supporting element (7) is made of an electrically non-conductive and non-ferromagnetic material.

38. Electrical power transmission line (1) according to claim 37, wherein said 25 electrically non-conductive and non-ferromagnetic material is selected from the group comprising: plastics materials, cement, terracotta, carbon fibres, glass fibres, wood.

39. Electrical power transmission line (1) according to claim 38, wherein said plastics materials are selected from the group comprising: polyethylene (PE), low-density polyethylene (LPDE), medium-density polyethylene (MPDE), high-density polyethylene (HPDE), linear low-density polyethylene (LLPDE), polypropylene (PP), 30

ethylene/propylene elastomer copolymers (EPM), ethylene/propylene/diene terpolymers (EPDM), natural rubber, butyl rubber, ethylene/vinyl copolymers, ethylene/acrylate copolymers, ethylene/α-olefin thermoplastic copolymers, polystyrene, acrylonitrile/butadiene/styrene resins (ABS), halogenated polymers, polyurethane (PUR), polyamides, aromatic polyesters.

5 40. Electrical power transmission line (1) according to claim 1, wherein said shielding element (6) further comprises a plurality of fixing means (14) longitudinally arranged at predetermined distances from each other, said fixing means (14) being intended to fix said cover (11) on said base (10).

10 41. Electrical power transmission line (1) according to claim 40, wherein said fixing means (14) are arranged in a plurality of pairs positioned along the sides of the shielding element (6) at a reciprocal longitudinal distance comprised between about 20 and about 100 cm.

15 42. Method for shielding the magnetic field generated by an electrical power transmission line (1) comprising at least one electrical cable (2), said method comprising the following steps of:

- providing at least one shielding element (6) made of at least one ferromagnetic material for shielding the magnetic field generated by at least one electrical cable (2), said at least one shielding element (6) comprising a base (10) and a cover (11);
- coupling at least one supporting element (7) to at least said base (10);
- laying said at least one electrical cable (2) into said base (10) of the shielding element (6); and
- leaning said cover (11) onto said base (10) so as to substantially close said shielding element (6).